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Autologous fat grafting to lumpectomy defects: complications, imaging, and biopsy rates



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ABSTRACT

Background: Autologous fat grafting is emerging as a promising reconstructive technique after breast conservation therapy (BCT). Recent evidence suggests that autologous fat grafting does not increase the risk of cancer recurrence; however, women may still be subject to unnecessary biopsies secondary to suspicious radiologic findings. The purpose of this study was to assess surgical complications and biopsy rates in these patients.

Methods: We retrospectively reviewed the records of women who underwent autologous fat grafting after BCT at a single institution over a 6-y period. Independent variables included demographic and operative details. Outcome variables included complications, and incidence of palpable masses and/or suspicious breast imaging findings requiring biopsy. Descriptive statistics were generated.

Results: Between June 2008 and February 2015, 37 women aged 41 to 74 y (mean 54.4 y) underwent a total of 56 fat grafting sessions for correction of contour deformities after BCT. The mean number of fat grafting procedures was 1.5 (range 1-4) per breast. Follow-up ranged from 1 to 99 mo (mean 29.5 mo). Imaging data were available for 31 (83.7%) breasts after autologous fat grafting. Biopsy was recommended in four cases after suspicious imaging findings or palpable masses (10.8%), with benign pathology in all cases. There was one incidence of a local wound infection. No other local or systemic complications were noted.

Conclusions: Our study demonstrated a risk of unnecessary biopsies after autologous fat grafting. Complication rates were low, and it appears to be a safe reconstructive option for the correction of contour deformities after BCT.

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Introduction

Breast reconstruction techniques have improved markedly over the last few decades, enabling women to choose from a wide variety of surgical options based on their personal preferences and reconstructive goals. Despite this progress, few options currently exist for the reconstruction of irradiated

lumpectomy defects. Autologous fat grafting has emerged as a promising technique that allows for reconstruction in this hostile wound bed. Recent studies have shown that grafting adipocytes and other cells to the area of radiation may help mitigate some of the deleterious effects of radiotherapy on skin and tissue as well as restore breast contour.¹⁻⁴ Although these results are encouraging, the use of autologous fat

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grafting to correct these defects has been controversial, as questions have been raised about the safety and efficacy of the procedure.⁵⁻⁷ In 1987, the American Society of Plastic Surgeons effectively prohibited the use of autologous fat grafting in the breast due to concerns regarding interference with cancer detection after the procedure and the potential of locoregional recurrence due to the unknown possibility of adipocyte stem cell proliferation.⁸ Subsequent studies led to a reversal of this prohibition. The minimally invasive nature of the technique and good cosmetic outcomes have allowed autologous fat grafting to re-emerge as an attractive reconstructive option. However, new potential restrictions from the Food and Drug Administration regarding both the manipulation of tissue and intentions for use have placed autologous fat grafting back in the spotlight.⁹ Thus, it is important to readdress these potential issues as the popularity of the procedure increases. Several reports have suggested that autologous fat grafting does not interfere with oncologic surveillance and the risk of locoregional recurrence does not increase after the procedure.¹⁰⁻¹⁵ However, concerns still exist regarding the ability of modern imaging techniques to differentiate between post-surgical calcifications of adipose tissue and malignancies.¹⁶ If imaging fails to differentiate benign and suspicious lesions, patients may be subjected to unnecessary biopsies to rule out carcinoma. Although there is growing evidence in support of the safe and effective use of autologous fat grafting in the breast, more research is needed to confirm patient safety and desirable outcomes, especially given the current concerns from the Food and Drug Administration.

The purpose of this study was to review a single center's experience with autologous fat grafting for the correction of lumpectomy defects after breast conservation therapy (BCT). We sought to evaluate outcomes including complications and biopsy rates after fat grafting.

Methods

This retrospective case series included consecutive patients who underwent autologous fat grafting for reconstruction after BCT between June 1, 2008, and February 1, 2015. Study patients included women aged 18 y and older who had previously undergone lumpectomies with radiation for breast cancer. Each patient had completed radiation therapy before the initial fat grafting procedure. Fat grafting procedures were performed as the sole reconstructive technique in all cases by five different plastic surgeons at the University of Michigan Health System. Patients who underwent treatment for local or distant recurrence between the primary cancer operation and the fat grafting procedure were excluded. In addition, patients who underwent fat grafting after implant-based reconstruction were omitted from this analysis.

Data were collected with review of the electronic medical records after approval of the study by the institutional review board. Current Procedural Terminology codes 15770, 19366, 19380, and 20926 were used to identify eligible patients from our billing data system. The medical records and operative notes were then reviewed with only patients who underwent fat grafting for a postlumpectomy/radiation defect subsequently included in the analysis.

Patients' demographic, breast cancer diagnosis, lumpectomy, and fat grafting procedure information were collected. The indications, location, and volume for grafting were also recorded. Our independent outcomes of interest after autologous fat grafting included donor and recipient site complications, systemic complications, and suspicious breast imaging findings and/or palpable breast masses requiring biopsy. Descriptive statistics were generated. A t-test was performed to compare the injection volumes between patients who underwent biopsy and those who did not. Owing to the large number of repeat grafting procedures, the outcomes were evaluated by breast, not by procedure.

Autologous fat grafting was performed under general anesthesia. Grafted fat was prepared and transferred according to the standard Coleman technique.¹⁷ After harvest from the abdomen, flanks, or thighs, the fat was centrifuged with the resulting oil and serous components drained. The processed fat was transferred to 3-mL syringes and injected utilizing blunt infiltration cannulas, placing a small aliquot of fat with each withdrawal of the cannula. All five surgeons' techniques remained consistent throughout the period of the study.

Results

From June 2008 to January 2015, 37 consecutive patients who underwent a total of 56 autologous fat grafting procedures for refinement of unilateral lumpectomy defects met inclusion criteria. The mean patient age was 54.4 y (range 41-74 y), and the mean body mass index was 27.6 kg/m² (range 20.5-37.5). Tobacco use was documented in four (10.8%) patients at the time of grafting. Of the 37 lumpectomies performed, carcinoma *in situ* was reported in 12 of the breasts, whereas invasive carcinoma was found in 23 of the breasts (specific cancer pathology was not available for two patients). For all patients, autologous fat grafting was the only reconstructive procedure used to correct the lumpectomy defect. All 37 patients received radiation therapy, which was noted to have always been completed before any fat grafting procedure. Patient demographic and cancer statistics are presented in [Table 1](#).

Table 1 – Patient demographics and breast cancer details by patient (n = 37).

Patient demographics	
Age, y (range)	54.4 (41-74)
Body mass index, kg/m ² (range)	27.6 (20.5-37.5)
Positive tobacco use, N (%)	4 (10.8%)
Breast cancer diagnosis*	
In-situ carcinoma, N (%)	12 (32.4%)
Invasive carcinoma, N (%)	23 (62.2%)
Breast cancer treatment	
Radiotherapy, N (%)	37 (100%)
Chemotherapy, N (%)	13 (35.1%)
Hormone therapy, N (%)	26 (70.3%)

* Specific cancer diagnosis data were not documented for two patients.

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